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"Not Applicable"

NON-PATENT DOCUMENTS

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BACKGROUND OF THE INVENTION

[0001] Atherosclerosis is a progressive disease characterized by the thickening, hardening and loss of elasticity of inner artery walls. The pathologic process underlies most coronary heart disease (CHD) and strokes.

[0002] Since atherosclerosis is a leading cause of mortality and morbidity in the world, intense research efforts have been dedicated to the disease for the past two centuries. Many researchers have been focusing on the understanding of atherosclerosis mechanism and the development of efficient screening procedures [1, 2].

[0003] Since Anitschkow, N. stated that dietary cholesterol caused atherosclerosis in 1913, over the past five decades, lipid-lowering therapy has played a central role in the prevention and treatment of

[0011] FIG.2 is a typical output screenshot of the MMA.exe showing the output including a total risk of the disease; a primary cause in the disease; a primary therapy target; a secondary therapy target; and a therapeutic efficacy for individuals who require the diagnosis, prevention or treatment of atherosclerosis-related CHD or stroke.

DETAILED DESCRIPTION OF THE INVENTION

[0012] The present invention is a multiparameter screening method that is used for combining the contributions of atherosclerotic risk factors to the disease, predicting a total risk of the disease and a disease risk level, determining a primary cause in the disease, assessing a therapeutic efficacy and optimizing the therapeutic targets at the different stages of the disease in different individuals who require the diagnosis, prevention or treatment of atherosclerosis-related CHD or stroke, which comprises the following phases:

defining the normal as free from atherosclerosis-related coronary heart disease or stroke;

the measured values refer to the quantities of atherosclerotic parameters to be measured;

an individual having the measured values of the atherosclerotic parameters;

providing the normal values of said atherosclerotic parameter;

determining the disease risks yielded by the differences between the measured values and the normal values of these atherosclerotic parameters;

adding all the disease risks together so as to yield a total risk of the disease;

determining a disease risk level containing the total risk of the disease;

selecting an atherosclerotic risk factor related to an atherosclerotic parameter that is the greatest contribution to the total risk so as to result in this risk factor as a primary therapy target of the disease;

determining a greater flux between the LDL mass transfer flux and the monocyte mass transfer flux so as to result in this greater flux as a primary cause in the disease;

selecting a greater concentration level between the LDL level in serum and the CRP level in blood plasma so as to result in this greater level as a secondary therapy target of the disease;

calculating a relative ratio between the current total risk from the currently measured values of these atherosclerotic parameters and the previous total risk from previously measured values of these parameters so as to yield this ratio as a therapeutic

efficacy of the disease; and

repeating the above-mentioned methods until the disease risk level is reduced to a normal level for the individual who requires the therapy to prevent or to treat atherosclerosis-related CHD or stroke.

the above-mentioned methods are written as an executable computer program named the MMA.exe to be installed into a general purpose digital computer device to accomplish said methods.

[0013] The method of this invention comprising the steps of:

[0014] Step one: Determining the mass transfer flux of the LDL particles and monocyte cells in blood to the endothelium at the arterial bifurcations, branching, curvatures or tapering, called the lesion-prone sites, so as to result in this flux as a primary cause in the disease, which comprise:

[0015] Major clinical studies [9-10, 19] state that early atherosclerosis lesions consist of both LDL and monocytes, which are transferred from blood to the arterial endothelium and accumulated in the subendothlium.

[0016] According to these clinical evidences, the

measured value of the LDL concentration parameter in Step 3.1 and a measured value of the CRP concentration parameter in Step 3.2 so as to result in this greater level as a secondary therapy target of the disease, said method comprising the steps of:

selecting the LDL concentration level in serum as a secondary therapy target of the disease when R_1 in Step 3.1 $\geq$ R_2 in Step 3.3; or

selecting the CRP concentration level in blood plasma as a secondary therapy target of the disease when R_1 in Step 3.1 $<$ R_2 in Step 3.3.

[0046] Step nine: Calculating a relative ratio between the current total risk of the disease and the previous total risk of the disease in Step four so as to yield this ratio as a therapeutic efficacy of the disease.

[0047] Step ten: Repeating the method in Step three through the method in Step nine until the disease risk leveling in step five is reduced to a normal level for the individual who requires the therapy to prevent or treat atherosclerosis-related CHD or stroke.

[0048] Step eleven: These methods in Step three through Step nine are written as an executable computer program named the MMA.exe to be installed into a general purpose digital computer device to accomplish these methods.

had the greatest predilection for atherosclerosis. However, the current screening methods such as screening LDL or cholesterol levels in the patient's blood are unable to determine the contribution of the arterial geometry to the disease. Internal angles among 70 human aortic bifurcations can vary widely from 10° to 70° [22]. Different internal angles may lead to different angle α in (1.3).

[0060] An individual A having a measured angle α_1 being 15°, an individual B having a measured angle α_2 being 45° and the two persons having a 1% increase in the LDL level in blood. Using said MMA.exe, this invention predicts a 7.2% lower total risk for 45° than for 15°. This risk from difference in the bifurcation's internal angles is significantly lower than the 1.5% reduction in risk from 1% reduction in LDL level [20], which indicates that the arterial geometry in certain instances can play a greater role in atherosclerosis than simply LDL level.

[0061] In the example, the method of this invention reveals that atherosclerosis is a multifactor disease with differently combined risk factors dominating in different individuals.

[0062] Example 5. The first step is inputting the currently measured values, the previously measured values